



Introduction:

It can be dangerous riding a bike, especially when you are not aware of your surroundings or not visible to others. For our project, we created a product that makes bicyclists safer by notifying them when an object is in their blind spots as well as an LED that illuminates when it is dark. Using the bike and light sensors, will make bicyclists safer wherever and whenever they ride.

How our Product Works:

This product is an attachment to a bicycle. When riders are using our product, if an object is within 20ft of the bicycle, the LED strip placed on the handlebars will light up on the right or left side, depending on the intruding object's location. In addition, an LED on the back of the bike will light up when it is dark to show cars a bicyclist is present.

Work Process:

- Determine Objectives:** Notify bicyclist when object is in blind spot and make bicyclist more visible when dark.
- How to Achieve Objective:** Use lidar sensors to detect objects and light detection sensor to make LED turn on.
- Coding Hardware:** Use Arduino's C++ based language to code all hardware components and test to assure hardware is working properly.
- Create Housing:** Design and use 3-D printer to create housing for Arduino and holder for lidar sensors.
- Assemble**

Lidar:

Lidar stands for Light Detection and Ranging. Lidar works by sending out pulses of light which are returned to the sensor. The amount of time it takes the light to return determines the distance of the object. Lidar is used widely used to create topographic maps

Hardware and Function:

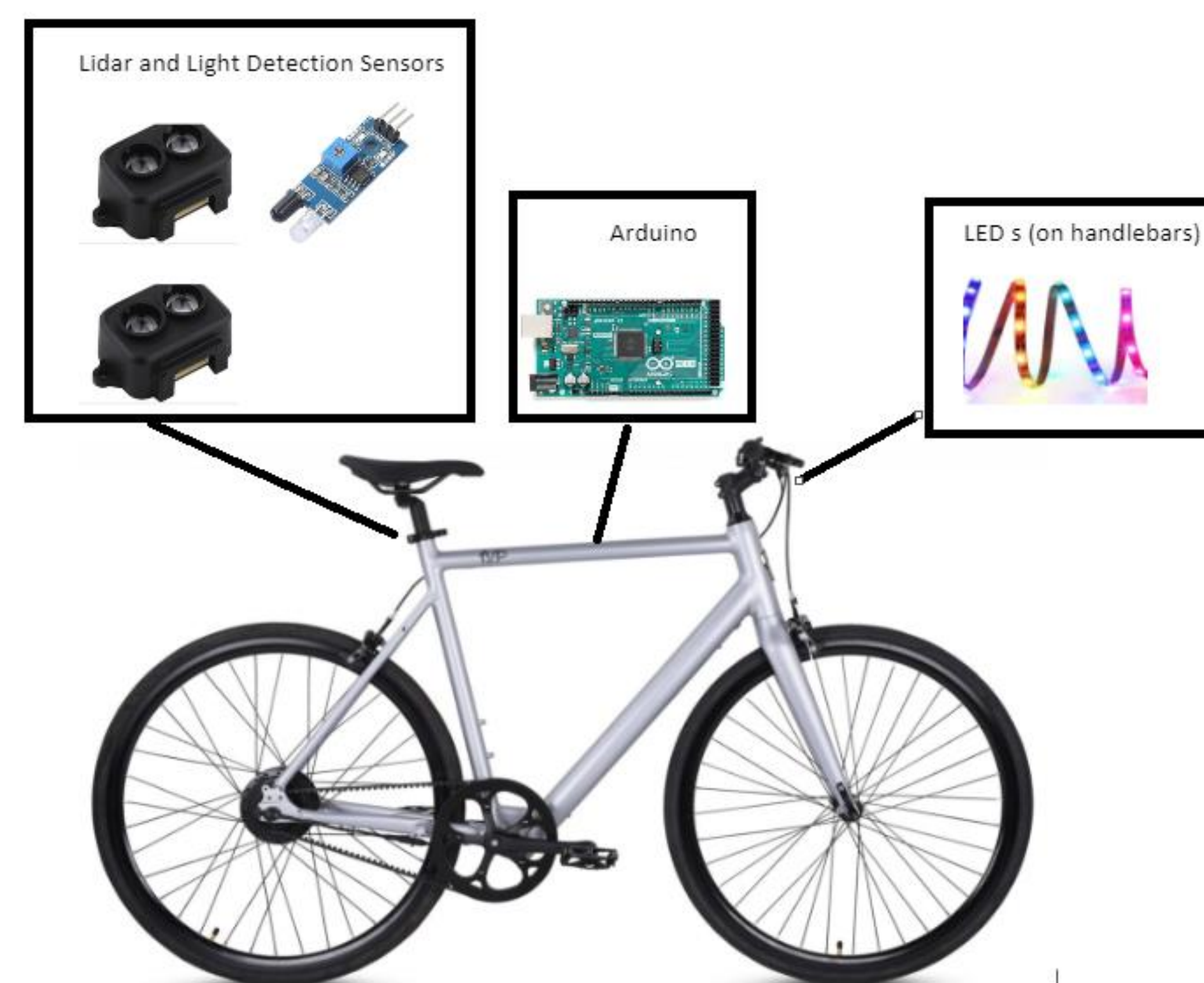
Arduino - microprocessor that communicated commands to hardware

LED strip- Placed on handlebar to

2 TF Luna Lidar Sensors- Placed 2 sensors on the back of bike and angled to detect both blind spots (right and left).

Light Detection Sensor- Place on back of bike where it can absorb light.

Placement of Hardware:



- *Wires connect Arduino to hardware components
- *Arduino is powered by 9V battery
- *Arduino is placed in housing for protection

Further and Future Applications:

Although our product is demonstrated on bicycles, the same application can be used for other methods of transportations such as scooters and golf carts. The lidar sensors can even be put on helmets and notify users via sound as well as the light detection sensor and illuminating LED when dark. In addition, this technology can be used outside the realm of transportation such as security. A possible adoption of our technology is a bank using lidar sensors that triggers cameras to display for security when an object comes within a certain distance of the bank.

Summary:

In conclusion, our product is meant to make riding bicycles safer by having the rider more aware of their surroundings while letting other vehicles see the rider. To detect vehicles in proximity, lidar sensor technology is used to light up LEDs to notify the rider. In addition, a light detection sensor lights up an LED when it is dark, making the rider more visible. This design is easily transferred to other modes of transportation such as scooters and can even be used on a helmet. In addition, the design can be used outside of transportation such as for the purpose of security.